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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,550	10/14/2003	Wayne G. Renken	SENS.005US1	4924

36257 7590 09/25/2006

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EXAMINER

SHAH, SAMIR M

ART UNIT	PAPER NUMBER
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2856

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/685,550	Applicant(s) RENKEN, WAYNE G.	
	Examiner Samir M. Shah	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-25, 27-36 and 45-54 is/are pending in the application.
- 4a) Of the above claim(s) 47-54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-25, 27-36, 45 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/14/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/14/2006 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 47-54 have been considered but are moot in view of the new ground(s) of restriction.
3. Applicant's arguments with respect to claims 21-25, 27-36 and 45-54 have been considered but are moot in view of the new ground(s) of rejection.

Election/Restrictions

4. Claims 47-54 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:
- I. Claims 21-25, 27-36, 45 and 46, drawn to substrate with sensors, electronics module with signal acquisition, data transmission and power, flexible leads connecting substrate and module, remote data processing system, classified in class 73, subclass 866.1.

- II. Claims 47-51, drawn to instrumented substrate, data processing system, electronics module that moves independent of substrate, physically continuous flexible connection between module and substrate, classified in class 438, subclass 18.
- III. Claims 52-54, drawn to method of sensing and analyzing process conditions in a substrate process environment including generating sensor signals, sending signal data to electronics module sending sensor signal data from module to a data processing system, moving module separately from data processing system, classified in class 438, subclass 18.

(a) Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require independent movement between the electronics module and the data processing system. The subcombination has separate utility such as selectively placing the data processing system inside and outside process environment, or using an electronics module that does not require a power source and can utilize an external power source, or transmitting processing conditions to the data processing system through wires/cables without the need of a wireless transceiver.

(b) Inventions I and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the product does not require independent movement between the data processing system and the electronics module, or the process can be practiced with another materially different product such as with a data transmission circuitry with wiring/cable(s) to transmit the processing conditions to the data processing system without the need for a wireless transceiver.

(c) Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 47-54 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Objections

5. Claim 36 is objected to because of the following informalities:

As to claim 36, line 2, delete "leads form a ribbon" and replace it with -- leads from a ribbon --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 33 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) As to claim 33, it is not clear whether “a remote system”, in 2nd line of the claim, is referring to the “remote data processing system” of independent claim 21, or is it referring to another remote system distinct from the “remote data processing system” of claim 21.

(b) Claim 36 recites the limitation "the flexible cable" in 1st two lines of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 21, 28, 30, 31 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Lauf et al. (US Patent 5,969,639 henceforth “Lauf”).

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(a) As to claims 21, 28, 30 and 35, Lauf discloses a process condition monitoring device comprising:

a substrate/wafer (710) having a first perimeter, the substrate/wafer (710) comprising sensors (720) to measure the processing conditions/temperature of the substrate/wafer (710) at different areas of the substrate/wafer (710) (figure 7; column 3, lines 46-50; column 6, lines 40-42);

an electronics module/signal conditioning circuit (730) having a second perimeter that encloses the same or less area than the first perimeter, the module/circuit (730) comprising (figure 7, column 3, lines 50-52; column 4, lines 15-18):

signal acquisition circuitry ("circuit 730 includes a clock and a memory whereby temperature data can be captured...and stored for later retrieval") coupled to an output of the sensors (720) (figure 7; column 3, lines 63-66);

data transmission circuitry/transmitter (750) and antenna (770) coupled to the signal acquisition circuitry (730) (figure 7; column 3, lines 52-61);

a power source (760) (figure 7; column 3, lines 58-59); and

leads (740) connecting the substrate/wafer (710) to the electronics module/signal conditioning circuit (730) for transmitting signals between the substrate/wafer (710) and the electronics module/signal conditioning circuit (730), the leads (740) providing a flexible connection that allows relative movement between the substrate/wafer (710)

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and the electronics module/signal conditioning circuit (730) (figure 7; column 3, lines 45-61); and

a remote data processing system/module (850) including an external data processing device, and wherein the data transmission circuitry/transmitter (750) and antenna (770) comprises a wireless/radio frequency (RF) transceiver to transmit the processing conditions to the remote system/module (850) (figures 7, 8; column 3, lines 52-61; column 4, lines 29-42).

(b) As to claim 31, Lauf discloses an infrared (IR) structure located on the surface of the wafer (710), which would enable the transmitting and receiving of IR signals (column 5, lines 25-55).

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 22, 24, 25, 27, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Smesny et al. (US Patent 5,444,637 henceforth "Smesny").

(a) As to claim 22, Lauf does not expressly teach the signal acquisition circuitry being configured to amplify an output signal of the sensors. However, Lauf discloses that the sensors (720) could be thermocouple, diode, resistive temperature detectors

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(RTD) or thermistors (claim 7; column 2, lines 13-18; column 4, lines 29-34); Lauf also discloses that "either amplitude or frequency modulation can be used" (column 4, lines 25-28).

Smesny discloses a "programmable semiconductor wafer for sensing, recording and retrieving fabrication process conditions" including sensors (12), which could be thermistors, thermocouple or diode (column 8, lines 63-68; column 9, lines 1-27) and an amplifier (46) configured to amplify an output signal of the sensors (12) (figure 3; column 10, lines 38-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include amplifying an output signal of the sensors (720), as suggested by Smesny, because sensors such as thermistors or RTD are well suited for producing an output voltage proportional to the sensor resistance and an amplified signal can be more accurately read/processed.

(b) As to claims 24 and 25, the resistance type temperature sensors of Lauf inherently require an input power signal in order to function as disclosed.

In the alternative, Smesny discloses a power supply (16) for "providing analog voltage level with sufficient current drive to sensors (12)" (column 8, lines 20-22).

It would be obvious to one of ordinary skill in the art at the time the invention was made to include a power supply for providing input power signals to sensors (720), as suggested by Smesny, because an input power signal is required for temperature sensors such as thermocouple or thermistors to function appropriately.

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(c) As to claim 27, Lauf does not expressly teach that the data transmission circuitry/transmitter (750) and antenna (770) comprises an analog to digital converter. However, Lauf discloses that "the transmitted signals can be digital or analog (column 4, lines 25-28).

Smesny discloses a signal acquisition/conditioning circuit or an analog to digital (A/D) converter (52) which receives analog signals (30) from each of the sensors (12) placed upon the wafer (10) and converts the analog signals (30) to corresponding digital signals (figure 3; column 10, lines 38-68; column 11, lines 1-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include converting analog signals to digital signals using an analog to digital converter, as suggested by Smesny, because digital signals can be more accurately processed by the data processing system/module (850) including an external data processing device and digital signals would be easier to be converted into useful information (read Lauf, column 4, lines 37-42).

(d) As to claim 32, Lauf does not expressly disclose that the wireless/radio frequency (RF) transceiver/transmitter (750) and antenna (770) transmits and receives sonic signals.

Smesny discloses probe pad (26) providing an optical or acoustic/sonic connection with an external communication device in order to exchange data related to the real time processing conditions so that it can be optimally controlled.

It would be obvious to one of ordinary skill in the art at the time the invention was made to achieve Lauf's communication with the processing remote processing system by sending/receiving acoustic/sonic signals from/with the transmitter (750)/antenna (770), as suggested by Smesny, because such an acoustic/sonic communication would enable the data related to the real time processing conditions of wafer (710) to be communicated with the remote data processing system and thus be optimally controlled/processed.

(e) As to claim 33, Lauf does not expressly that the data transmission circuitry/transmitter (750) and antenna (770) comprises one or more connectors to couple a remote system to the device with a communications cable.

Smesny teaches probe pad (26), which can provide a mechanical access/connection of the wafer (10) to an external communication device.

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include mechanical connectors for connecting the data transmission circuitry/transmitter (750) and antenna (770) of the wafer (710) with a remote system, as suggested by Smesny, because this would allow mechanical access from an external output device such as, for instance, the data information stored within the memory of circuit (730).

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12. Claims 23, 29 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Schwartz et al. (US Patent 5,669,713 henceforth "Schwartz").

(a) As to claims 23, 29 and 34, Lauf does not expressly disclose that the electronics module/signal conditioning circuit (730) or the remote data processing system/module (850) (including an external data processing device) comprises a micro-controller and is configured to process the output signal using sensor calibration coefficients to provide a final output value.

Schwartz discloses, in a patent entitled "calibration of process control temperature transmitter", calibrating resistance or thermocouple type temperature sensors (16, 18), with a calibration device, in order to derive a calibration value R_{PRTCAL} (NEW) with a micro-controller/microprocessor (22) and provide a final output value (figure 5; column 1, lines 13-34; column 7, lines 30-67; column 8, lines 1-5)

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include a micro-controller for processing the output signals from the resistance type temperature sensors (720) using sensor calibration coefficients/values and get a final output value, as suggested by Schwartz, because this provides a compact device as a rapid and accurate means of correcting temperature values against an accurate standard.

While Schwartz teaches no particular location for where the calibration processing should occur, Examiner considers it would have be obvious to one of ordinary skill in the art at the time the invention was made to process the calibration of

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the signals either at the electronics module/signal conditioning circuit (730) or at the remote data processing system/module (850) (including an external data processing device), since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70 (CCPA 1950).

13. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Renken et al. (US Patent 6,190,040 henceforth "Renken").

(a) As to claim 36, Lauf does not expressly disclose the leads (740) being from a ribbon cable.

Renken teaches ribbon cables 52, 62 in a similar application.

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include leads from a ribbon cable, as suggested by Renken, because such leads have many advantages like extremely small bending radius, high flexibility and minimum waste of space.

14. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Akram et al. (US Patent 6,472,240 B2 henceforth "Akram").

(a) As to claim 45, Lauf discloses the electronics module/signal conditioning circuit (730) being, in a first position, above the substrate/wafer (710). However, Lauf does not

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expressly disclose the electronics module/signal conditioning circuit (730) being, in a second position, displaced from the substrate/wafer (710) as described in the claim.

Akram discloses "methods of semiconductor processing" including a substrate (11) having a first perimeter and electronics module/external circuitry (12) having a second perimeter wherein the electronics module/circuitry (12), in a first position, is above the substrate (11) (figures 1, 1B; column 4, lines 1-3; column 5, lines 11-28) and, in a second position, is displaced from the substrate (11) such that the first and the second perimeter do not intersect (figures 1, 1A; column 3, lines 28-67; column 4, lines 1-3, 61-67; column 5, lines 1-10).

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include having the electronics module/signal conditioning circuit (12), in a second position, displaced from the substrate/wafer (710) such that the first and the second perimeter do not intersect, as suggested by Akram, because this would enable the functioning of the electronics module/signal conditioning circuit (12) without interfering with the processing/conditioning of the substrate/wafer (710) and thus allow the electronic functions to be performed remotely.

(b) As to claim 46, it is noted that the intended use of "the electronics module and the substrate" does not afford patentable weight. The court Held, *In re Pearson*, 494 F.2d 1399, 181 USPQ 641 (CCPA 1974); *In re Yanush*, 477 F.2d 958, 177 USPQ 705 (CCPA 1973); *In re Finsterwalder*, 436 F.2d 1028, 168 USPQ 530 (CCPA 1971); *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967)) *In re Otto*, 312 F.2d 937, 136

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USPQ 458 (CCPA 1963); Ex parte Masham, 2 USPQ2d 1647 (BdPatApp & Inter 1987), that the recitation with respect to the manner in which an apparatus is intended to be employed does not impose any structural limitation upon the claimed apparatus which differentiates it from a prior art reference disclosing the structural limitations of the claim. Therefore, in this case, the “robot hands” do not comprise a functional part of the invention and the use of “robot hands” to hold “the electronics module and the substrate”, in a particular position, is considered intended use.

Conclusion

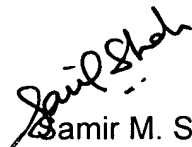
15. The prior art made of record and not relied upon, cited in the attached 892 form, is considered pertinent to applicant's disclosure.

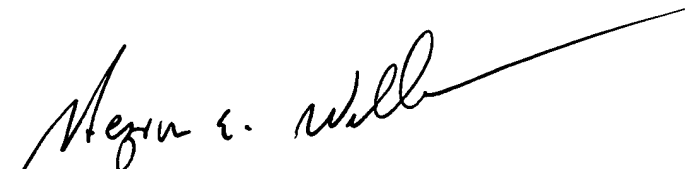
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samir M. Shah whose telephone number is (571) 272-2671. The examiner can normally be reached on Monday-Friday 9:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Samir M. Shah
Art Unit 2856
9/14/2006


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